CF Extension: Tagging Attribute Names with Namespace Tags

(Trying to push forward with CF Trac Ticket # 27)

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Proposal

- Extend CF to allow tagging of attribute names with namespace tags (similar to XML Namespace).
  - A namespace is identified by a URI.
  - A namespace prefix/tag is associated with a namespace.
  - Prefixing an attribute name with a namespace prefix/tag and a colon (':') places that attribute name in the associated namespace.
  - Example:

```
<cfnsDeclaration> "cf = http://cfconventions.org/";
standard_name = "longitude";      // in empty/default namespace
cf:standard_name = "longitude";  // in CF namespace
```

Advantages

- Data providers can use multiple attribute conventions without having to worry about attribute name clashes.

- CF can use other attribute conventions without duplicating them directly in CF.

Issues

- Backward compatibility
- Declaring namespaces in data file
- Construction of namespace URIs
- Possible semantic conflict/overlap
- Mapping of external convention into CF

Issue: Backward Compatibility

- Not an issue if CF attributes always in default/empty namespace.
  - But then CF itself looses many of the advantages of being namespace aware.
  - Best practice till namespaces widely adopted
- Considerations if no backward compatibility restrictions:
  - NUG and COARDS attributes
  - ???

Issue: Declaring Namespaces

- Some possibilities:
  - Use "Conventions" global attribute
  - Use "Conventions" and "namespaces" global attributes
  - Use a namespace container variable (similar to grid_mapping)
  - Use XML Namespace syntax

Issue: Declaring Namespaces

Use "Conventions" global attribute

Conventions = "CF-1.0, wcs=http://www.opengis.net/wcs/1.1";

Use "Conventions" and "namespaces" global attributes

Conventions = "CF-1.0";
namespaces = "wcs=http://www.opengis.net/wcs/1.1";

Issue: Declaring Namespaces

Use a namespace container variable (similar to grid_mapping)

```
char namespace_declarations;
        :cf = "http://www.cfconventions.org/";
        :wcs = "http://www.opengis.net/wcs/1.1";
        :dc = "http://www.dublincore.org/";
        ...
```

Use XML Namespace syntax

```
xmlns = "urn:cfns:cf-1.4:" ; // Defines the default namespace.
xmlns:wcs = "http://www.opengis.net/wcs/1.1";
```

Issue: Possible semantic conflict/overlap

- External conventions might contain semantics that overlap or conflict with CF semantics.

- Several possible options:
  - CF keeps a controlled list of allowed external conventions making sure there are no conflicts or overlaps between CF and all conventions on the controlled list.
  - CF semantics must be consistent and overrule external semantics. Add to specification:
    - **"All CF semantics must be correct and consistent, and shall not be modified by non-CF attributes."**
  - CF semantics must be consistent. Add to specification:
    - **"All CF semantics must be correct and consistent."**

Issue: Namespace URI

- Should there be any restrictions or rules for construction of namespace URIs?
  - Controlled by CF and/or registered with CF?
- Possibilities discussed:
  - Use the rules discussed in NUG for constructing a URL from the value of the "Conventions" global attribute for namespace URI construction.
  - CF controlled list of allowed namespaces and their URIs.
  - Namespace URI defined by external convention (similar to XML Namespaces).
- General agreement:
  - Don't extend the meaning of the "Conventions" attribute.
  - CF maintained list would be too much work.

Issue: Mapping external convention into CF

- How do external, non-attribute based conventions get mapped into an attribute list?
    - E.g., OGC WCS concepts are defined in UML (and XML Schema) which don't easily translate into a simple list of attributes.

Discussion

- Basic proposal
- Backward compatibility
- Declaring namespaces used
- Namespace URI form and control
- Semantic overlap or conflict
- Mapping into attributes

Further Discussion

- CF Trac Ticket #27:
  - https://cf-pcmdi.llnl.gov/trac/ticket/27